

## **REMARKS**

### **A. Status of Claims**

Favorable reconsideration of this application, as presently amended, is respectfully requested. Claims 2, 5-6, 8, 10-19, 35, and 37 have previously been cancelled. Claims 33 and 40 are currently cancelled. Claims 1, 3-4, 7, 9, 20-32, 34, 36, 38-39, and 41 are currently pending

### **B. Procedural Matters**

Applicants acknowledge the statement at page 5 of the present Office Action that Applicants' prior arguments with respect Claims 1, 3-4, 7, 9, 20-34, 36, and 38-41 have been considered, but are now moot in view of new grounds of rejection which are discussed below.

### **C. Amendments to Claims**

Claim 1 has been amended to recite subjecting pulp containing softwood fibers to a solution containing **ferrous (II) or ferric (III)** metal ions at a concentration **of** from 0.002% to about 0.1% by weight based on pulp and a peroxide at a pH between about **2 and about 7**. Support for these amendments to Claim 1 may be found, for example, in paragraphs [0034] and [0035] of the published version (i.e., U.S. Pat. Appln. No. 20050061455) of the above application.<sup>1</sup>

Claim 3 has been amended to recite that **ferrous chloride, ferrous sulfate, or ferric chloride are a source of** the **ferrous (II) or ferric (III)** metal ions. Support for these amendments to Claim 3 may be found, for example, in paragraph [0034] of the published version (i.e., U.S. Pat. Appln. No. 20050061455) of the above application.

Claim 26 has been amended to conform to the language of amended Claim 1.

Like Claim 3, Claim 27 has been amended to recite **ferrous chloride, ferrous sulfate, or ferric chloride are a source of** the **ferrous (II) or ferric (III)** metal ions. Support for these amendments to Claim 27 may be found, for example, in paragraph

---

<sup>1</sup> All references to the above application herein will be with respect to the published version U.S. Pat. Appln. No. 20050061455, published March 24, 2005.

[0034] of the published version (i.e., U.S. Pat. Appln. No. 20050061455) of the above application.

Claim 28 has been amended to conform to the language of amended Claim 1. Support for these amendments to Claim 28 may also be found, for example, in paragraphs [0013] and [0035] of the published version (i.e., U.S. Pat. Appln. No. 20050061455) of the above application.

Claim 30 has been amended to conform to the language of amended Claim 1, as well as to recite adding a source of ferrous (II) or ferric metal ions. Support for these amendments to Claim 30 may also be found, for example, in paragraph [0034] of the published version (i.e., U.S. Pat. Appln. No. 20050061455) of the above application.

Claim 31 has been amended to conform to the language of amended Claim 30.

Claim 32 has been amended to conform to the language of amended Claim 29.

Claim 34 has been amended similar to Claim 1 to recite adding ferrous (II) or ferric (III) metal ions at a concentration of from 0.002% to about 0.1% by weight based on pulp to a solution comprising peroxide to form a metal-ion activated peroxide; and contacting pulp including softwood fibers with the metal ion-activated peroxide at a pH between about 2 and about 7. Support for these amendments to Claim 34 may be found, for example, in paragraphs [0034] and [0035] of the published version (i.e., U.S. Pat. Appln. No. 20050061455) of the above application.

Like Claims 3 and 27, Claim 36 has been amended to recite ferrous chloride, ferrous sulfate, or ferric chloride are a source of the ferrous (II) or ferric (III) metal ions. Support for these amendments to Claim 27 may be found, for example, in paragraph [0034] of the published version (i.e., U.S. Pat. Appln. No. 20050061455) of the above application.

Like Claim 28, Claim 38 has also been amended to conform to the language of amended Claim 34. Support for these amendments to Claim 38 may also be found, for example, in paragraphs [0013] and [0035] of the published version (i.e., U.S. Pat. Appln. No. 20050061455) of the above application.

Because Claim 40 has been cancelled, Claim 41 has been amended to depend from amended Claim 41.

**D. Response to Rejection of Claims 1, 4, 7, 9, 20-26, 28-34, 36, and 38 under 35 U.S.C. § 102(b) as Being Anticipated by Kubelka**

At pages 2-3 of the present Office Action, Claims 1, 4, 7, 9, 20-26, 28-34, 36, and 38 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Kubelka et al., “Delignification with Acidic Hydrogen Peroxide Activated by Molybdate (hereafter referred to as “**Kubelka**”). **This rejection is respectfully traversed with respect to Claims,**<sup>2</sup> as amended or as currently presented, for at least the following reasons.

In support of the rejection of Claims 1, 4, 7, 9, 20-26, 28-34, 36, and 38 under 35 U.S.C. § 102(b) as being anticipated by **Kubelka**, the present Office Action makes the following allegation:

***Allegation 1:*** [**Kubelka**] teach[es] a process of treating softwood fibers by subjecting a softwood pulp to a solution containing peroxide and [] **transition metal salts, Molybdate and Tungsten**, at pHs between 2 to 5; peroxide concentration between 0.5-2% and transition metal level up to 1000 ppm, (0.1%). See table VII. Table II shows temperatures of 85°C and residence times of 2 hrs. the data in table II shows [a] decrease in viscosity by the treatment and table VIII shows that the pulps were refined, i.e., beaten. [**Kubelka**] also teach[es] the use of pre-bleached pulps and the same softwood fibers as claimed, see Table 1 for the pulps and Tables IV-V for the bleached Kraft pulps.<sup>3</sup>

In response to what Allegation 1 asserts, Claim 1 has been amended to recite subjecting pulp containing softwood fibers to a solution containing **ferrous (II) or ferric (III)** metal ions and peroxide, i.e., **the peroxide oxidative degradation of cellulose** in those softwood fibers is activated by **ferrous (II) or ferric (III)** metal ions. Similarly, Claim 34 has been amended to recite adding **ferrous (II) or ferric (III)** metal ions to a solution comprising peroxide **to form the metal-ion activated peroxide** which contacts the pulp including the softwood fibers **to cause oxidative degradation of cellulose** in those softwood fibers.

By contrast, **Kubelka** only teaches delignification of kraft pulp with acidic (at pH 5) hydrogen peroxide activated by **tungstates** (e.g., sodium tungstate) and **molybdates** (e.g.,

---

<sup>2</sup> Claim 33 has been cancelled, as addressed below. Accordingly this rejection is now moot with respect to Claim 33.

<sup>3</sup> See page 2 of the present Office Action (emphasis added).

sodium molybdate).<sup>4</sup> Nowhere does **Kubelka** teach or suggest using ferrous (II) or ferric (III) metal ions to activate peroxide according to amended Claims 1 and 34. Accordingly, amended Claims 1 and 34 are now patentable over **Kubelka**.

Remaining Claims 4, 7, 9, 20-26, 28-32, 34, 36, and 38, as amended or as currently presented, depend directly or indirectly from either amended Claim 1 or amended Claim 34. Accordingly, Claims 4, 7, 9, 20-26, 28-32, 34, 36, and 38 are patentable over **Kubelka** for at least the same reasons amended Claims 1 and 34 are patentable over this reference.

In further support of the rejection of Claim 33 under 35 U.S.C. § 102(b) as being anticipated by **Kubelka**, the present Office Action makes the following additional allegation:

***Allegation 2:*** Claim 33 is a product by process claim and the pulp produced by [**Kubelka**] teach[es] a pulp which is the same as the ones claimed, since they teach the same process of making and they use the same raw materials. As the afore mentioned claims are product by process claims it is deemed that “[A]n difference imparted by the product by process claims would have been obvious to one having ordinary skill in the art at the time the invention was made because where the examiner has found a substantially similar product as in the applied prior art the burden of proof is shifted to the applicants to establish that their product is patentably distinct, . . . .” In re Brown, 173 U.S.P.Q. 685, and In re Fessmann, 180 U.S.P.Q. 324. Further, “[P]rocess limitations are significant only to the extent that they distinguish the claimed product over the prior art product.” In re Luck, 177 U.S.P.Q. 523 (1973).<sup>5</sup>

In response to Allegation 2, Claim 33 has been cancelled. Accordingly, the rejection of Claim 33 under 35 U.S.C. § 102(b) as being anticipated by **Kubelka** is now moot.

For at least the foregoing reasons, Claims 1, 4, 7, 9, 20-26, 28-32, 34, 36, and 38, as amended or as currently presented, are patentable over **Kubelka**. Accordingly, the rejection of these Claims under 35 U.S.C. § 102(b) as being anticipated by this reference should be withdrawn.

---

<sup>4</sup> See page 1 of **Kubelka**.

<sup>5</sup> See pages 2-3 of the present Office Action (emphasis added).

**E. Response to Rejection of Claims 3, 27, and 40-41 under 35 U.S.C. § 103(a) as Being Unpatentable over Kubelka, in view of any of Sun, Leporini, Rahmawati, or Ruuttunen**

At pages 4-5 of the present Office Action, Claims 3, 27, and 40-41 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over **Kubelka**, in view of any of Sun et al., “The Effect of Metal Ions on the Reaction of Hydrogen Peroxide with Kraft Lignin Model Compounds” (hereafter “**Sun**”), Leporini et al., “Hydrogen Peroxide in Chemical Pulp Bleaching: An Overview” (hereafter “**Leporini**”), Rahmawati et al., “Pulp Bleaching by Hydrogen Peroxide Activated with Copper 2,2-Dipyridylamine and 4-Aminopyridine Complexes (hereafter “**Rahmawati**”), or Ruuttunen et al., “Concomitant Usage of Transition Metal Polyanions as Catalysts in Oxygen Delignification: Laboratory Beach Trials,” (hereafter “**Ruuttunen**”). **This rejection is respectfully traversed with respect to Claims 3, 27, and 41.**<sup>6</sup> as amended, for at least the following reasons.

In support of the rejection of Claims 3, 27, and 41 under 35 U.S.C. § 103(a) as being unpatentable over **Kubelka**, in view of any of **Sun**, **Leporini**, **Rahmawati**, or **Ruuttunen**, the present Office Action makes the following allegation:

**Allegation 3: [Kubelka] does not teach the use of other transitional metals for the activation of the peroxide. However, the secondary references teach that other transitional metals, including copper and iron can be used to activate/catalyze peroxide to delignify or bleach cellulose fibers. Therefore, substituting the transition metal taught by [Kubelka] with iron and copper would have been obvious to one of ordinary skill in the art since he/she would have a reasonable expectation of success if such metals were used, since they have been used for the same purpose. “[W]here two equivalents are interchangeable for their desired function, substitution would have been obvious and thus, express suggestion of desirability of the substitution of one for the other is unnecessary.” In re Fout 675 F.2d 297, 213 USPQ 532 (CCPA 1982); In re Siebentritt, 372 F.2d 566, 152 USPQ 618 (CCPA 1967). Also, it has been held that it is obvious to try, choosing from a finite number of identified, predictable solutions with a reasonable expectation of success. See recent Board decision Ex parte Smith, \_\_\_ USPQ2d \_\_\_, slip op. at 20, (Bd. Pat. App. & Interf. June 25, 2007)(City KSR, 82 USPQ2d at 1396).**<sup>7</sup>

<sup>6</sup> Claim 40 has been currently cancelled, so that the rejection of this Claim under 35 U.S.C. § 103(a) as being unpatentable over **Kubelka**, in view of any of **Sun**, **Leporini**, **Rahmawati**, or **Ruuttunen**, is now moot.

<sup>7</sup> See pages 4-5 of the present Office Action (emphasis added).

In response to what Allegation 3 asserts, Claim 1 (from which Claims 3 and 27 depend, directly or indirectly) has been amended to recite subjecting pulp containing softwood fibers to a solution containing ferrous (II) or ferric (III) metal ions and peroxide at a pH between about 2 and about 7, i.e., the peroxide oxidative degradation of cellulose in those softwood fibers is activated by ferrous (II) or ferric (III) metal ions at an acidic to neutral pH. Similarly, Claim 34 (from which Claim 41 directly depends) has been amended to recite adding ferrous (II) or ferric (III) metal ions to a solution comprising peroxide to form the metal-ion activated peroxide which contacts the pulp including the softwood fibers at a pH between about 2 and about 7 to cause oxidative degradation of cellulose in those softwood fibers.

As amended, Claims 3, 27, and 41 are patentable over **Kubelka**, even in view of **Sun**, **Leporini**, **Rahmawati**, or **Ruuttunen**, for at least the same reasons presented above in response to Allegation 1, as well as the following additional reasons. First, as conceded by Allegation 3, **Kubelka** does not teach other transition metals, such as the ferrous (II) or ferric (III) metal ions of amended Claims 1 and 34, as well as the sources of those metal ions (ferrous chloride, ferrous sulfate, or ferric chloride) specifically recited in amended Claims 3, 27, and 41. Second, and contrary to what Allegation 3 suggests, “substituting the transition metal taught by [**Kubelka**] with iron” (e.g., ferrous (II) or ferric (III) metal ions according to amended Claims 1 and 34) in an acidic to neutral pH (i.e. a pH between about 2 and about 7) process (also according to amended Claims 1 and 34) for “activat[ing]/catalyz[ing] peroxide to delignify or bleach cellulose fibers” is unobvious, and particularly is not suggested by any of the four secondary references relied upon by Allegation 3:

1. **Sun Reference.** The abstract of **Sun** relied upon by Allegation 3 teaches treating five monomeric or dimeric phenolic lignin model compounds with alkaline hydrogen peroxide, not an acidic to neutral pH (i.e., pH between about 2 and about 7) peroxide treatment according to amended Claims 1 and 34. In addition, these alkaline pH hydrogen peroxide treatments of **Sun**, which were carried out in the absence or presence of  $\text{Mn}^{2+}$ ,  $\text{Cu}^{2+}$ ,  $\text{Fe}^{3+}$ , and  $\text{Mg}^{2+}$  teach that the transition metals increased in reactivity in the order  $\text{Mn}^{2+} > \text{Cu}^{2+} > \text{Fe}^{3+}$ . In other words, the abstract of **Sun** would, at most, more likely suggest substituting  $\text{Mn}^{2+}$  or  $\text{Cu}^{2+}$  not  $\text{Fe}^{3+}$  (i.e., ferric (III)). Moreover, the abstract of **Sun** says nothing about using  $\text{Fe}^{2+}$  (i.e., ferrous (II)) as the transition metal.

2. **Leporini Reference.** Contrary to the requirements of 37 CFR § 1.104(c)(2),<sup>8</sup> as well as to MPEP § 707.05,<sup>9</sup> Allegation 3 never says what portions of this 27 page reference **are specifically relied upon**, and **specifically what this reference is relied upon to teach**, other than the vague statement that “other transitional metals, including copper and iron can be used to activate/catalyze peroxide to delignify or bleach cellulose fibers.” In fact, what **Leporini** does teach supports Applicants’ position that the peroxide oxidative degradation of cellulose in softwood fibers activated by **ferrous (II) or ferric (III)** metal ions **at an acidic to neutral pH** is unobvious. Page 4 of **Leporini** specifically says that “metal impurities have to be removed from the pulp before a subsequent peroxide treatment” and that in “conventional bleaching processes metals are removed during acidic bleaching stages.”<sup>10</sup> In addition, pages 4-5, as well as Figure 3 and Table 2 on page 5, of **Leporini** teach removing iron (as well as manganese) with chelating agents to improve bleaching performance. In other words, **Leporini** “teaches away” from activation of peroxide oxidative degradation of cellulose in softwood fibers by using **ferrous (II) or ferric (III)** metal ions **at an acidic to neutral pH** according to amended Claims 1 and 34, as well as amended Claims 3, 27, and 41.

3. **Rahmawati Reference.** **Rahmawati** teaches bleaching pulp with hydrogen peroxide with certain copper (II) pyridyl/pyridine complexes.<sup>11</sup> No mention is made in this reference of using **ferrous (II) or ferric (III)** metal ions as recited in amended Claims 1 and 34, and especially the **ferrous (II) or ferric (III) metal salts** recited in amended Claims 3, 27, and 41. Page 168 of **Rahmawati** also teaches carrying out pulp bleaching using a sodium carbonate buffer (pH 10, or a basic pH), not an **acidic to neutral pH** according to amended Claims 1 and 34, as well as amended Claims 3, 27, and 41.

---

<sup>8</sup> 37 CFR § 1.104(c)(2) states, in relevant part, that: “The pertinence of each reference, **if not apparent**, must be clearly explained and each rejected claim specified.” (Emphasis added.)

<sup>9</sup> MPEP § 707.05 (Citation of References) states, in relevant part, that: “When such prior art is cited, its pertinence should be explained.”

<sup>10</sup> See also paragraph [0034] of the published version (i.e., U.S. Pat. Appln. No. 20050061455) of the above application: “contrary to the conventional peroxide treatment of pulp wherein transitional metal ions are avoided or eliminated, the treatment solution of the present invention” includes transition metal ions such as ferrous (II) and ferric (III) salts.

<sup>11</sup> See, for example, abstract and front page 167 of **Rahmawati**.

4. **Ruuttunen Reference.** Ruuttunen teaches acidic (i.e., pH ~2-6) pulp bleaching pulp with hydrogen peroxide but, like Kubelka, by using certain silicomolybdates.<sup>12</sup> No mention is made in this reference of using **ferrous (II) or ferric (III)** metal ions as recited in amended Claims 1 and 34, and especially the **ferrous (II) or ferric (III) metal salts** recited in amended Claims 3, 27, and 41.

In summary, what Allegation 3 asserts provides no “reasoning” which has a “rational underpinning” (i.e., is **factually supported**) for combining the secondary references (i.e., Sun, Leporini, Rahmawati, or Ruuttunen) with primary reference (i.e., Kubelka) with respect to amended Claims 3, 27, and 41. “Rejections on obviousness grounds cannot be sustained by mere **conclusory statements**; instead there must be some **articulated reasoning** with some **rational underpinning** to support the legal conclusion of obviousness.”<sup>13</sup> Contrary to what Allegation 3 asserts, the **ferrous (II) or ferric (III) metal salts** recited in amended Claims 3, 27, and 41, amended Claims 3, 27, and 41, are not “interchangeable equivalents” for the tungstates or molybdates taught by Kubelka, even in view of what is allegedly taught or suggested by Sun, Leporini, Rahmawati, or Ruuttunen for at least the reasons presented above. Accordingly, any reliance upon the case law cited in Allegation 3 is misplaced with respect to amended Claims 3, 27, and 41.

For at least the foregoing reasons, Claims 3, 27, and 41, as amended, are patentable over Kubelka, even in view of any of Sun, Leporini, Rahmawati, or Ruuttunen. Accordingly, the rejection of these Claims under 35 U.S.C. § 103(a) as being unpatentable over this combination of references should be withdrawn.

---

<sup>12</sup> See, for example, abstract and page 2 of Ruuttunen.

<sup>13</sup> See e.g., *In re Kahn*, 78 U.S.P.Q.2d at 1336 (emphasis added), cited with approval in the Supreme Court’s decision in *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007). In *KSR International*, the Supreme Court also observed “in formulating a rejection under 35 U.S.C. § 103(a) based upon a combination of prior art elements, it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed.” *Id.* See also *In re Vaidyanathan* (Fed. Cir. 2010)(non-precedential)(slip opinion at 17): “Obviousness is determined as a matter of foresight, not hindsight. [Citations to *KSR International* and *Graham v. John Deere Co.* omitted]. *KSR [International]* did not free the PTO’s examination process from explaining its reasoning. In making an obviousness rejection, **the examiner should not rely on conclusory statements that a particular feature of the invention would have been obvious or was well known.** Instead, **the examiner should elaborate, discussing the evidence or reasoning that leads the examiner to such a conclusion** (emphasis added).

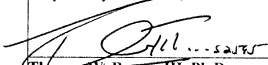


**F. Conclusion**

Claims 1, 3-4, 7, 9, 20-32, 34, 36, 38-39, and 41, as amended or as currently presented, are patentable over the art relied upon in the present Office Action. Accordingly, Claims 1, 3-4, 7, 9, 20-32, 34, 36, 38-39, and 41 are in condition for allowance, and favorable action is earnestly solicited thereon.

Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact Dr. Thomas W. Barnes at 513-248-6736 to expedite prosecution of the above application.

Please charge the amount of **\$0.00** required for the request for extension of time to our Deposit Account No. 09-0525. In the event any variance exists between the amount enclosed and the Patent Office charges for filing the above-noted documents, including any fees required under 37 C.F.R. 1.136 for any necessary Extension of Time to make the filing of the attached documents timely, please charge or credit the difference to our Deposit Account No. 09-0525. Further, if these papers are not considered timely filed, then a petition is hereby made under 37 C.F.R. 1.136 for the necessary extension of time.

Correspondence Client Number: <b>01726</b>  (513) 248-6736 (phone) (513) 248-6455 (fax)	Respectfully Submitted,	
		
	<b>Thomas W. Barnes III, Ph.D.</b>	
	Registration No.	<b>52,595</b>